

the County, surrounding the major lakes in the County, in large areas of wetlands in the western portion of the County, and in the Kettle Moraine area. These primary environmental corridors contain almost all the best remaining woodlands, wetlands, and wildlife habitat areas in the County, and represent a composite of the best remaining elements of the natural resource base. The protection of the primary environmental corridors from additional intrusion by incompatible land uses, and from degradation and destruction, is one of the principal objectives of the County development plan. Their preservation in an essentially open natural state, including park and open space uses, will serve to maintain a high level of environmental quality in the County, protect the remaining natural beauty, and provide valuable recreation opportunities. In 1990, primary environmental corridors encompassed 145 square miles, or about 25 percent of the total area of the County.

Secondary Environmental Corridors

As further shown on Map 30, secondary environmental corridors in Waukesha County are generally located along the small perennial and intermittent streams within the County. These secondary environmental corridors also contain a variety of resource elements, often remnant resources from primary environmental corridors which have been developed for intensive agricultural and urban purposes. Secondary environmental corridors facilitate surface water drainage, maintain pockets of natural resource features, and provide corridors for the movement of wildlife, as well as for the movement and dispersal of seeds for a variety of plant species. Such corridors, while not as important as primary environmental corridors, should also be preserved in essentially natural, open uses as development proceeds within the County, particularly when the opportunity is presented to incorporate secondary environmental corridors into urban stormwater retention basins, associated drainage ways, and neighborhood parks. In 1990, secondary environmental corridors encompassed 12 square miles, or about 2 percent of the total area of the County.

Isolated Natural Resource Areas

In addition to the primary and secondary environmental corridors, other smaller pockets or concentrations of natural resource-base elements exist within Waukesha County. These pockets are isolated from the environmental corridors by urban development or agricultural use, and although

separated from the environmental corridor network, these isolated natural resource areas have significant value. They provide the only available wildlife habitat in an area, usually provide good locations for local parks, and lend unique aesthetic character and natural diversity to an area. The isolated natural resource areas in Waukesha County are shown on Map 30 and include isolated wetlands, woodlands, and wildlife habitat areas. In 1990, isolated natural resource areas encompassed 13 square miles, or about 2 percent of the total area of the County.

SUMMARY

This chapter has described the natural resource base of Waukesha County. The protection and wise use of this natural resource base is necessary for the provision of a pleasant and habitable environment for life. The following findings will have particular significance in the preparation of the development plan for Waukesha County.

1. Air quality is an important consideration in the County development plan because of its effects on the natural environment and the local economy. The most serious air-quality concern in Waukesha County and throughout Southeastern Wisconsin is ground-level ozone, which is harmful to human health, can injure plants and animals, and causes materials to deteriorate in the man-made environment. Because of frequent exceedences of Federally promulgated ozone standards, the U. S. Environmental Protection Agency has identified a multi-state ozone "nonattainment" area along Lake Michigan, extending from northern Indiana through the Chicago metropolitan area to Door County, Wisconsin, including Waukesha County. This designation poses a constraint on the location of industries which emit significant amounts of volatile organic compounds or nitrogen oxides, which react with other substances in the air under certain meteorological conditions to form ozone. This designation also impacts transportation facility development and requires measures designed to reduce emissions from transportation sources.
2. Waukesha County exhibits numerous surficial landforms and features resulting from glaciation, has varied bedrock geology, and

exhibits relatively large differences in topographic elevation. These features lend diversity to and enhance the County's natural character and also provide important tangible natural resources. The dominant topographic and physiographic feature is the Kettle Moraine, a long and complex interlobate moraine which traverses the western portion of the County in a generally northeasterly-to-southwesterly direction. The Kettle Moraine area contains the greatest topographic relief and highest elevations in Waukesha County. Lapham Peak, in the Town of Delafield, is the highest point at 1,233 feet above sea level. The depth of glacial deposits over bedrock ranges from zero to approximately 500 feet. Bedrock outcrops, in the form of Niagara dolomite, are located along a northeasterly-southwesterly alignment paralleling the Kettle Moraine, indicating the presence of a pre-glacial ridge. These rock outcrops and associated quarrying operations are concentrated in the northeastern portion of the County.

3. Waukesha County contains a wide variety of soil types, ranging from poorly drained organic soils to excessively drained mineral soils. It is essential that new urban development be properly located with respect to the soils of the County, since many soils exhibit significant limitations for urban development. Analysis of detailed soil survey data indicates that 216 square miles, or 37 percent of the total land area of the County, is covered by soils with severe limitations for residential development served by public sanitary sewer service. Stated differently, they are unsuitable for residential development of any kind. Based upon current administrative rules and regulatory practice, 247 square miles, or about 45 percent of the total land area of the County, is covered by soils considered unsuitable for conventional onsite sewage disposal systems. In addition, 152 square miles, or about 27 percent of the total land area of the County, is classified as undetermined, meaning onsite investigations are necessary to determine whether specific areas of land are suitable for conventional onsite sewage disposal systems. Approximately 188 square miles, or about 34 percent of the total land area of the County, is considered unsuitable for "mound" onsite

sewage disposal systems. In addition, 80 square miles, or about 14 percent of the total land area of the County, is classified as undetermined.

4. Analysis of detailed soil survey data also indicates that portions of the County may present important opportunities for resource-based uses such as agriculture and mineral extraction. Approximately 277 square miles, or about one-half of the total land area of Waukesha County, is covered by soils classified as either National prime farmland or farmland of Statewide importance. Of this land, 211 square miles, or about 75 percent, is covered by soils considered National prime farmland. Soil survey data indicate that large areas of the western half of the County have potential commercially viable sand and gravel deposits, while much smaller areas, primarily in the northeast portion of the County near the Villages of Lannon and Sussex, have bedrock at or near the surface and are probably feasible areas for quarrying.
5. Waukesha County is underlain by three major groundwater aquifers, including, from the land surface downward, the sand and gravel glacial drift aquifer, the Niagara dolomite aquifer, and the deep sandstone aquifer. The glacial drift and Niagara aquifers are often relied upon as a source of potable water where public water supplies are not available, whereas the sandstone aquifer is tapped mostly for public water supplies and by large water users.

In comparison to the sandstone aquifer, the glacial drift and Niagara aquifers, shallow, near-surface aquifers, are more susceptible to pollution from the surface. The sandstone aquifer is separated from the shallower aquifers by a relatively impervious layer of Maquoketa shale. This layer of shale is absent in the western one-third of the County, however, where the sandstone aquifer is directly overlaid by moderately permeable glacial drift. This area is part of the recharge area for the sandstone aquifer, and extends into neighboring Dodge, Jefferson, and Walworth Counties. Special care must be taken in this area to protect the underlying groundwater resource.

Areas with a high groundwater table, in addition to imposing severe physical limitations on urban development, have potential for polluting groundwater. Substantial areas of Waukesha County, mostly in and near wetlands, floodlands, and inland lakes, exhibit a seasonal high groundwater table of less than 10 feet below ground. Urban land uses in these areas should be discouraged, in part because of the potential for contamination of the shallow glacial drift and Niagara aquifers.

Naturally occurring radium has been found to exceed the current State and Federal standards in several public water systems relying on the deep sandstone aquifer as a source of supply. Exceedences have been reported in systems serving the southern portion of the City of Brookfield, the City of New Berlin, the Village of Eagle, the Village of Sussex, and the City of Waukesha. Evaluations are underway to consider alternative means of reducing the radium levels in wells. The U. S. Environmental Protection Agency is also reevaluating its standard for radium in water supplies and may eventually permit radium concentrations greater than permitted under the current standard.

6. Waukesha County contains 33 major lakes with a combined surface area of approximately 21.9 square miles, or about 4 percent of the total area of the County. This represents about 38 percent of the combined surface area of the 101 major lakes in the seven-county Southeastern Wisconsin Region. The largest lake in the County is Pewaukee Lake, with a surface area of nearly 2,500 acres, or 3.9 square miles. Most of the major lakes in the County are rated as mesotrophic or borderline mesotrophic-eutrophic, which indicates medium to medium-poor water quality. It should be noted that some lakes in the County are naturally eutrophic, or warm, shallow, and weedy, while others have experienced decline in water quality due to intensive development on their shores, inadequate or failing septic systems, and elevated levels of sedimentation from agriculture and urban stormwater runoff.

7. Waukesha County includes portions of four major watersheds: the Fox (Illinois),

Menomonee, Rock, and Root River watersheds. The Fox River watershed, which encompasses 336 square miles, or about 58 percent of the total area of the County, and the Rock River watershed, which encompasses 194 square miles, or about 33 percent, are part of the Mississippi River drainage basin. The Menomonee River watershed, which encompasses 38 square miles, or about 6.5 percent of the total area of the County, and the Root River watershed, which encompasses 13 square miles, or about 2.3 percent, are part of the Great Lakes-St. Lawrence River drainage basin. The Mississippi River basin and the Great Lakes-St. Lawrence River basin are separated by a subcontinental divide which traverses the easternmost portion of the County in a generally north-south direction. Diversion of water from Lake Michigan across the subcontinental divide without provision for returning the spent water to the Lake is subject to numerous legal restrictions.

Floodlands in Waukesha County, areas that are subject to inundation by the 100-year recurrence interval flood event, have been identified by the Regional Planning Commission, the Federal Emergency Management Agency (FEMA), and the Wisconsin Department of Natural Resources. These areas are not suitable for urban development because of flood hazards, high water tables, and inadequate soils, but tend to be suitable for parks and open space and should thus be considered for such uses and protected. The identified floodlands encompass about 72 square miles, not including nearly 24 square miles of surface water, or about 13 percent of the total land area of the County.

8. Waukesha County contains extensive areas of environmental significance. In 1990, wetlands encompassed 81 square miles, or about 14 percent of the total area of the County, while woodlands encompassed 46 square miles, or about 8 percent. A 1985 inventory conducted jointly by the Wisconsin Department of Natural Resources and the Southeastern Wisconsin Regional Planning Commission identified areas encompassing a total of 182 square miles, or 31 percent of the total area of the County, as important wildlife habitat. Prairies, treeless or generally

treeless areas dominated by native grasses, are very limited, found primarily in the southwestern corner of the County. Inventories conducted in 1990 identified 34 small sites in the County as prairies, which, when combined, encompassed about 280 acres, or less than one-half square mile.

9. While not strictly defined as part of the natural resource base, certain sites, including major park and open space sites, scenic viewpoints, historic sites, and natural area sites, are closely linked to the underlying natural resource base. Waukesha County contains 19 major park and open space sites, or sites at least 100 acres in size. Together, these sites encompassed approximately 27 square miles, or 5 percent of the total area of the County, in 1993. In 1993, there were 124 sites in Waukesha County listed on the National Register of Historic Places, including 112 individual sites and 12 historic districts. Natural area sites, or areas containing intact or nearly intact native plant and animal communities, covered 21.4 square miles, or 3.7 percent of the total area of the County, on 105 sites in 1994. Public ownership is likely the most effective means of preserving the remaining natural area sites in the County. In addition, in 1994 there were a total of 36 critical species habitat sites located outside the identified natural areas. Together these 36 sites encompassed an area of 8.2 square miles, or 1.4 percent of the total area of the County. Recommendations related to the preservation of natural areas and critical species habitat sites are presented in Chapter XIII of this report.

10. Many of the natural resource base elements of Waukesha County occur in linear concentrations on the landscape. One of the most important tasks completed under the regional planning program for Southeastern Wisconsin has been the identification and delineation of these linear areas, or corridors. The most important elements of the natural resource base and closely related features including wetlands, woodlands, prairies, wildlife habitat, major lakes and streams and associated shorelands and floodlands, and historic, scenic, and recreational sites, when combined, result in an essentially linear pattern referred to by the Regional Planning Commission as environmental corridors. Primary environmental corridors include a wide variety of important natural resource and related elements and are, by definition, at least 400 acres in size, two miles long, and 200 feet wide. Primary environmental corridors in the County are mainly associated with natural resources located along major streams, around inland lakes, and along the Kettle Moraine. Together in 1990, these areas encompassed 145 square miles, or about 25 percent of the total area of the County. The preservation of the identified corridors in natural, open uses is essential to the maintenance of the overall environmental quality of Waukesha County. Conversely, since many corridor areas consist of wetland and floodplain areas and are therefore poorly suited for intensive urban development, the avoidance of development within the corridors serves to prevent the creation of further environmental and developmental problems.